REMARKS/ARGUMENTS

Claims 1-45 remain pending in the application, wherein claims 1, 8-10, 18, 19, 21-23, 27, 31, 34 and 37 have been amended. No claims were cancelled or added.

I. CLAIM OBJECTIONS

The Office Action objects to claims 8 and 9 on the grounds they lack antecedent basis for the term "said endosperm". Accordingly, Applicants have amended these claims to depend from claim 3 rather than claim 1 in order to provide proper antecedent basis.

Claim 18 was objected to for allegedly being indefinite with respect to the term "a more highly processed fiber". Applicants have amended claim 18 in order to more specifically define the types of fibers that fall within the scope of the claim. Support for the amendment to claim 18 is found at page 15, ¶ [0040] of the application.

II. PROVISIONAL OBVIOUSNESS-TYPE DOUBLE PATENTING REJECTIONS

The Office Action provisionally rejects claims 1-45 under the judicially-created doctrine of obviousness-type double patenting as being unpatentable over claims 1-43 of copending U.S. application Serial No. 10/767,320 and claims 1-37 of copending U.S. application Serial No. 10/723,999. Without acquiescing in this rejection, Applicants are submitting a Terminal Disclaimer concurrently herewith in order to remove the rejection.

III. REJECTIONS UNDER 35 U.S.C. § 103

The Office Action, mailed December 15, 2004, considered claims 1-45. In that action, claims 1-45 stand rejected over various combinations of art.[1] In response, Applicants will first

[1] Claims 1, 2, 11-14, 16-23, 26-28, 31-33, and 38-45 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Krieger (US 3,763,072) in view of Kasai (JP 110611120), Seymour (US 2,978,312), Wilson (US 5,129,936), and Haile (US 6,777,465). Claims 3-10, 29, 30, and 34-37 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Krieger in view of Kasai, Seymour, Wilson, and Haile, in further view of Toyo (JP-2002068879-A) and Oji (JP-2004141147-A). Claims 24 and 25 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Krieger in view of Kasai, Seymour, Wilson, and Haile in further view of Novich et al. (US 6,042,305). Claim 15 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Krieger in view of Kasai, Seymour, Wilson, and Haile in further view of Hauschild (U.S. Pat. No. 3,907,538). Although the prior art status of Krieger, Kasai, Seymour, Wilson, Haile, Toyo, Novich et al., and Hauschild is not challenged at this time, Applicants reserve the right to challenge the prior art status of those (and any other) cited art at any appropriate time, should it arise. Accordingly, any arguments and amendments made herein should not be construed as acquiescing to any prior art status of those (or any other) cited art.

provide a brief explanation of the disclosed compositions, including how they are formulated and how they operate to bind soil and promote revegetation of denuded soil when topically applied thereto. Applicants will thereafter explain how the claims as amended distinguish over the applied art.

The disclosed compositions include a soil binding portion and a soil revegetation portion suitable for topical application to denuded soil. The soil binding portion includes water, a carbohydrate, a protein, an iron compound, and a strong base. The carbohydrate and protein are the primary constituents responsible for binding soil particles together when the soil binding and revegetation compositions are topically applied to soil. The strong base increases the solubility of the carbohydrate and protein in water by making the composition strongly pH, at least initially. The iron forms part of the binding matrix, and is believed to promote an electrochemical reaction in the presence of water. A pH adjustor (*e.g.*, an acid) may optionally be added to reduce the pH in order for the composition to be less alkaline when applied to soil.

The soil revegetation portion includes two different kinds of fibers: (1) a first type of fibers that promote adhesion of the soil binding and revegetation composition to soil when applied topically to denuded soil; and (2) another of the types of fibers that facilitate emergence of newly sprouted seeds or plants through the fibrous composition when applied to soil. By way of example, the first type of fibers includes more highly processed fibers (*e.g.*, that have substantial physical and structural breakdown of the fiber shaft, such as recycled paper, recycled newsprint, partially digested wood or plant fibers, and chemically pulped wood or plant fibers). By way of example, the second type of fibers includes coarser fibers (*e.g.*, that are less structurally broken down, such as thermally processed wood fibers, other wood fibers, staple fibers, synthetic fibers, and inorganic fibers).

Claims 1 and 27 were amended in order to (i) specify that the claimed soil binding and revegetation composition is suitable for application to denuded soil so as to prevent or slow erosion of the soil, (ii) more clearly identify which portion of the claimed soil binding and revegetation is responsible for binding soil particles together, (iii) more clearly define the role of the strong base in increasing the solubility of the carbohydrate and protein in water by making the composition strongly pH, at least initially, and (iv) more clearly identify which portion of the composition is responsible for promoting soil revegetation. Support the foregoing amendments

is found in the application at page 3, ¶ [0007]; page 9, ¶ [0025]; page 11, ¶ [0029]; page 13, ¶ [0033]; page 14, ¶ [0037].

In contrast to the compositions defined in claims 1 and 27 as amended, U.S. Patent No. 3,763,072 (*Krieger*) discloses a soil adhesion composition that includes, as the soil particle binding system, a mixture of an acrylic emulsion polymer and sodium silicate. Col. 2, lines 30-31; col. 4, lines 70-71. The soil binding system is strong enough to form bricks used for building houses and other structures. Col. 2, lines 36-39; col. 8, lines 32-34. Krieger neither teaches nor suggests a soil binding system that includes a mixture of water, carbohydrate, protein, iron compound, and strong base.

Krieger also fails to teach or suggest a soil binding and revegetation composition that includes a soil revegetation portion comprising "at least two different types of fibers", *e.g.*, one that promotes adhesion of the composition to soil and another that facilitates emergence of newly sprouted seeds or plants through the fibrous (claim 1). Instead, Krieger merely discloses the use of a "mulch" of no specified composition. Examples include wood fiber, hay, straw, and cottonseed hulls. Col. 10, lines 13-15.

JP-11061120 (*Kasai*) was combined with *Krieger* on the grounds that it would have been obvious to modify the composition of *Krieger* to include minerals, carbohydrates and proteins as disclosed in *Kasai*. The combination of *Krieger* and *Kasai* is misplaced because one of skill in the art would not have been motivated to combine these references. *Krieger* discloses a "method of treating soil to prevent wind and water erosion" by making the soil "adhesive" using an "aqueous solution" that is applied by "spraying". Col. 2, lines 25-28 and 33-34. *Kasai*, by contrast, discloses the manufacture of dried solid granules from sludge to make a fertilizer product that is applied in <u>solid particulate form</u> to soil. Abstract. There is no teaching or suggestion that the dried sold fertilizer granules made in *Kasai* would be capable of binding soil together to prevent wind and water erosion. Nor does *Kasai* teach or suggest reconstituting the dried fertilizer granules with water to form an aqueous composition that is sprayed onto soil as a liquid to bind soil and prevent erosion. In short, there is no sufficient relationship between the aqueous erosion prevention composition of *Krieger* and the dry, solid granular fertilizer composition of *Kasai* that would have motivated one of skill in the art to combine the teachings of these references.

Even if combined, there is no reasonable expectation of success if one were to modify the soil binding system of *Krieger* by adding the minerals, carbohydrates, and proteins of *Kasai*. An important aspect of the soil binding system of *Krieger* is the interaction between the acrylic emulsion or latex and sodium silicate. According to *Krieger*, the sodium silicate assists the composition "in penetrating into the soil to prevent the formation of a mere surface layer of the acrylic polymer". This delicate relationship might be altered or harmed by adding the minerals, carbohydrates and proteins of *Kasai*.

"The aqueous composition, upon drying and curing in the soil, forms a crust which is semi-impervious and reduces water infiltration into the soil". Col. 4, lines 39-41. More fundamentally, *Krieger* teaches that "the volume of water used in the application of the aqueous composition to the soil is the determining factor in erosion control, rather than the amount of concentrate the soil receives. Greater or deeper penetration of the aqueous composition into the soil is achieved by employing greater amounts of water in the composition. The thickness of the erosion resistant crust is dependent upon the depth of penetration by the composition." Col. 4, lines 47-51. Because the mineral, carbohydrate and protein of *Kasai* are explicitly used to form dried solid fertilizer granules, there would be no expectation that modifying *Krieger* to include these components would assist in providing good soil penetration of the *Krieger* composition. In fact, carbohydrates and proteins made water soluble by adding a strong base would likely cause significant thickening of the composition, thereby *inhibiting* penetration into the soil, since they are known to those of skill in the art to bind water. Inhibiting penetration of the composition into the soil would be contrary to *Krieger*. Therefore, *Krieger* implicitly teaches away from adding components such as carbohydrates and proteins that might inhibit the ability of the acrylic emulsion or latex from penetrating deep into the soil.

U.S. Patent No. 2,978,312 (*Seymour*) was combined with *Krieger* on the grounds that it would have been obvious to modify the composition of *Krieger* to include a water soluble strong base. *Seymour*, like *Kasai*, relates to the manufacture of a hard, dry fertilizer product. Col. 2, lines 48-53; col. 3, lines 3-4. Therefore, one of skill in the art would not have been motivated to modify the soil penetrating aqueous composition of *Krieger* to include components disclosed in *Seymour* for making a hard, dry fertilizer product. More fundamentally, *Seymour* does not teach or suggest adding a base to a soil binding composition in order to enhance the solubility of a carbohydrate and protein in water, as recited in claims 1 and 27. That is because neither

Seymour nor *Krieger* teach or suggest a composition containing a carbohydrate and protein. And if a carbohydrate and protein were added to the *Krieger* composition, adding a strong base to make them more water soluble would likely thicken the composition, thereby inhibiting penetration into soil. *See* Application, page 13, ¶ [0034].

Even more fundamentally, *Seymour* fails to disclose an amount of strong base that would yield a composition is that has "a strongly alkaline pH" as recited in claims 1, 27 and 34 and taught at page 4, ¶ [0011] of the application. The sole purpose of employing a strong base in *Seymour* is to effect the hydrolysis of metaphosphate and react with the resulting orthophosphate during the manufacture of phosphatic fertilizers. Col. 1, lines 15-17 and 48-66. Thus, it would be contrary to *Seymour* to employ the strong base for some other completely unrelated purpose (*e.g.*, increasing the solubility of carbohydrates and proteins in water). *Seymour* further teaches that "[t]he proportion of strong base employed <u>does not materially exceed the stoichiometric quantity</u> required for complete reaction with the primary orthophosphate resulting from hydrolysis of the metaphosphate, otherwise <u>an excess of the strong base would be present in the finished product</u>." Col. 2, lines 4-9 (emphasis added). Thus, even if the phosphate fertilizer product of *Seymour* were added to the *Krieger* composition, there would be little, if any, remaining strong base available for reaction with carbohydrate and protein since the base is consumed in the reactions with metaphosphate and orthophosphate. Col. 1, lines 52-66; col. 2, lines 4-9.

U.S. Patent No. 5,129,936 (*Wilson*) was combined with *Krieger* on the grounds that it would have been obvious to modify the composition of *Krieger* to include an iron compound. *Wilson*, like *Kasai* and *Seymour*, relates to the manufacture of a "dried" solid fertilizer product. Abstract. Therefore, one of skill in the art would not have been motivated to modify the soil penetrating aqueous composition of *Krieger* to include components disclosed in *Wilson* for making a "dried" fertilizer product.

More fundamentally, the teachings of *Wilson* are completely at odds with a composition that includes a "strong base". That is because *Wilson* is specifically directed to an "acidic fertilizer with a high iron content" made by reacting iron compounds with concentrated sulfuric acid to yield an iron compound that contains "plant-available iron and sulfur". Col. 1, lines 42-44 and 65-68. The sulfuric acid used to make the disclosed iron fertilizer product of *Wilson* is "concentrated sulfuric acid" having a concentration of "93% tp 98.5%". Col. 2, lines 49-50; col.

4, lines 22-24; col. 5, line 8. *Wilson* disparages iron compositions made by other methods because they quickly form "plant-unavailable forms of iron". Col. 6, lines 16-20 and 54-63. Obviously, adding a "strong base" so as to yield a composition that is has "a strongly alkaline pH" as recited in claims 1, 27 and 34 as now amended would be contrary to the teachings of *Wilson* since it would completely neutralize the sulfuric acid and interfere with the formation of the desired iron-sulfur compounds disclosed in *Wilson*, which require "concentrated sulfuric acid". For this same reason, it would be contrary to *Wilson* to provide compositions within the pH ranges of claims 21-23 since such ranges are all above 7 and therefore on the basic side of the pH scale (*i.e.*, *Wilson* does not, in fact, disclose compositions having an alkaline pH since reacting iron with concentrated sulfuric acid yields "an <u>acidic</u> fertilizer"). Col. 1, line 43 (emphasis added).

U.S. Patent No. 6,777,465 (*Haile*) was combined with *Krieger* on the grounds that it would have been obvious to modify the composition of *Krieger* to include highly processed fibers. *Haile*, like *Krieger*, relates to a composition that includes an acrylic polymer binder; not a soil binding system comprising water, a carbohydrate, protein, iron and strong base. Abstract. Moreover, neither reference discloses the use of "at least two different types of fibers". Each, in fact, only teaches the use of one type of fibers. Neither understands the synergistic results of including two different types of fibers (*e.g.*, more highly processed for better adhesion to soil and coarser fibers for enhanced plant emergence). Thus, even if one were to modify *Krieger* by substituting the mulch optionally included in the *Krieger* composition with the paper fibers disclosed in the example of *Haile*, the resulting composition would not contain "at least two different types of fibers" as required by each of the independent claims as originally filed.

JP 2002068879 (*Toyo*) was combined with *Krieger* on the grounds that it would have been obvious to modify the composition of *Krieger* to include a carbohydrate and protein provided by an endosperm. *Toyo*, like *Kasai, Seymour* and *Wilson*, relates to the manufacture of a "dried" fertilizer product. Therefore, one of skill in the art would not have been motivated to modify the soil penetrating aqueous composition of *Krieger* to include components disclosed in *Toyo* for making a "dried" fertilizer product. More fundamentally, the fertilizer product of *Toyo* does not necessarily include a carbohydrate and protein but rather utilizes rice bran of starch seeds to promote rapid fermentation of organic waste material. It is well known that fermentation converts sugars (*i.e.*, carbohydrates) into CO_2, lactic acid, alcohol and other small

molecules. The fermentation process also likely breaks down proteins found in the endosperm and organic waste.

JP 2004141147 (*Oji*) was combined with *Krieger* on the grounds that it would have been obvious to modify the composition of *Krieger* to include a carbohydrate and protein provided by an endosperm from specific grains or beans. In response, Applicants respectfully point out that *Oji* does not qualify as prior art under 35 U.S.C. § 102. *Oji* is a publication of an application for patent in Japan and bears a publication date of May 20, 2004, which is <u>after</u> both the earliest effective filing date (November 26, 2003) and the actual filing date (January 29, 2004) of the present application. As such, it cannot be cited as prior art under any of 35 U.S.C. §§ 102(a), 102(b), or 102(e), the only sections that relate to a printed publication. Accordingly, *Oji* as a publication is entirely irrelevant to the claims of the present application.

U.S. Patent No. 6,042,305 (*Novich*) was combined with *Krieger* on the grounds that it would have been obvious to modify the composition of *Krieger* to include an organic acid as a pH adjustor. *Novich* is directed to fiber-reinforced dredged soil, not a composition that can be applied to soil by spraying. For this reason alone, one of skill in the art would not have been motivated to combine *Krieger* and *Novich*.

U.S. Patent No. 3,907,538 (*Hauschild*) was combined with *Krieger* on the grounds that it would have been obvious to modify the composition of *Krieger* to include an alkali metal hydroxide. *Hauschild* is directed to a process for preventing the formation of deposits on the internal walls of rotary kilns during the production of fertilizers (Title), not a process for prevention erosion by applying a composition that can be applied to soil by spraying. Thus, *Hauschild* clearly constitutes non-analogous art to both *Krieger* and the recited claims. For this reason alone, one of skill in the art would not have been motivated to combine *Krieger* and *Hauschild* and or apply *Hauschild* against the claims of the present application.

More fundamentally, the alkali metal hydroxide used in *Hauschild* is reacted with "rock phosphate" to yield a fertilizer product, not to increase solubility of a carbohydrate and protein in water. Col. 3, lines 3-8. Indeed, a carbohydrate and protein could not survive the extreme temperatures (900-1600°C) employed in the kiln used to make the fertilizer product of *Hauschild*. Col. 3, lines 10-11. At such temperatures, the carbohydrate and protein would be completely burned out. As such, the alkali metal hydroxide could hardly improve their solubility in water.

Given the large number of references found in disparate and unrelated arts relied upon when rejecting the claims of the present application, it is clear that hindsight was used as the motivation for combining the references rather than any teaching or suggestion found in the art. Indeed, the Office Action never cites to any teaching or suggestion in the art when alleging the motivation to combine the references. Rather, the rejections simply pick and choose from among the many disparate references, apparently using the current application as a guide. According to the MPEP, the motivation for combining references and/or modifying a reference must come from the prior art, not applicant's own disclosure.

Even if the references were combined, their combined teachings fail to teach or suggest each and every limitation found in the claims as now amended. Claim 1 as amended requires "a soil binding portion for binding soil particles together comprised of the mixture products of: water; a carbohydrate; a protein; an iron compound; and a strong base for increasing solubility of the carbohydrate and protein in the water by making the composition strongly alkaline pH at least initially". The only two references that disclose a strong base are *Seymour* and *Hauschild*. As discussed above, the strong base used in *Seymour* is consumed by reaction with metaphosphate and orthophosphate. *Seymour* teaches that the amount of strong base "does not materially exceed the stoichiometric quantity required for complete reaction" with the metaphosphate and orthophosphate. Therefore, there would be no remaining strong base for reacting with the carbohydrate and protein to make them more water soluble, even assuming one of skill in the art would have been motivated to modify the teachings of *Krieger* to include a carbohydrate and protein according to *Kasai* and the iron compound according to *Wilson*.

On the other hand, since the purpose of the alkali metal hydroxide used in *Hauschild* is to react with "rock phosphate" within a kiln to prevent adhesion to the kiln walls, but because the kiln temperature is between 900-1600°C, no carbohydrate or protein could possibly persist in the presence of the alkali metal hydroxide. It would therefore be impossible for the alkali metal hydroxide, when used as intended in *Hauschild* to make a fertilizer product, to increase the solubility of carbohydrate and protein since none could exist. The same is true for any organic fibers included within a soil binding and revegetation composition according to claim 1.

In addition, even assuming one of skill in the art would have been motivated to modify the teachings of *Krieger* to include an iron compound according to *Wilson*, it would be contrary to *Wilson* to include an iron compound in combination with the strong base of claim 1 to yield a

composition having "strongly alkaline pH". *Wilson* explicitly teaches the importance of providing an "acidic fertilizer" containing a specific type of iron compound that can only be formed by reacting it with "concentrated sulfuric acid". Iron compounds formed in other ways quickly yield forms of iron that are "plant-unavailable". *Wilson* therefore teaches away from iron-containing compositions that have alkaline pH since it is well known that alkaline forms of iron are water insoluble and therefore "plant-unavailable".

None of the references, alone or in combination, teach or suggest a soil binding and revegetation composition that includes "at least two different types of fibers". Instead, the only two references that disclose fibers, *Krieger* and *Haile*, only teach the use of one type of fibers. To allege that two references, each teaching the use of one type of fibers, suggests the use of two different fibers in a single composition is no more logical than saying that two references to cars, one for a car with a big steering wheel and another to a car with a small steering wheel, if combined, would suggest the desirability of a single car having both large and small steering wheels.

For each of the foregoing reasons, Applicants submit that claim 1 is patentable and unobvious over the combined teachings of the applied art. Claim 27 is similarly patentable over the combined teachings of the cited art since it essentially recites the same soil binding portion as claim 1, except for water.

Claim 34 alternatively claims a method that includes (1) "mixing together water, an endosperm comprising carbohydrate and protein, an iron compound, and a strong base to form an intermediate composition <u>having a strongly alkaline pH</u>; and" (2) "adding a fibrous material to form the soil binding and revegetation composition". The combined teachings of the applied art neither teach nor suggest acts (1) and (2) for essentially the same reasons given above with respect to claim 1. The strong base of *Seymour* "does not materially exceed the stoichiometric quantity required for complete reaction" with the metaphosphate and orthophosphate. Therefore, there would be insufficient remaining strong base for forming an intermediate composition <u>having a strongly alkaline pH</u>, even assuming one of skill in the art would have been motivated to modify the teachings of *Krieger* to include a carbohydrate and protein according to *Kasai* and the iron compound according to *Wilson.*

On the other hand, *Hauschild* teaches feeding an alkali metal hydroxide into a kiln with rock phosphate and heating the mixture to 900-1600°C, which would destroy the carbohydrate

and protein, even assuming one of skill in the art would have been motivated to modify the teachings of *Krieger* to include a carbohydrate and protein according to *Kasai*.

Moreover, it would clearly be contrary to *Wilson* to include the strong base of *Seymour* or *Hauschild* since it would destroy the "acidic fertilizer" of *Wilson* by rendering the iron "plant-unavailable".

Finally, none of the references teach or suggest adding at least two different types of fibers to a soil binding and revegetation composition.

Claim 38 is patentable because it recites a method of using the patentable composition of claim 1.

IV. CONCLUSION

In view of the foregoing, Applicants submit that the claims as amended are in allowable form. In the event that the Examiner finds remaining impediment to a prompt allowance of this application that may be clarified through a telephone interview or which may be overcome by examiner amendment, the Examiner is requested to contact the undersigned attorney.

Dated this 11th day of March 2005.

Respectfully submitted,

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